

CLAIMS

The invention claimed is:

1. A medical device designed for insertion into a body, the device comprising:
an elongated member having a proximal end and a distal end for insertion into the body; and
a location indicating element flexibly coupled to the distal end of the elongated member and capable of being tracked from a location external to the body wherein an encounter with an obstacle causes a change in the orientation of the location indicating element.
2. The device of claim 1 wherein the location indicating element is flexibly coupled to the elongated member using an elastic polymer.
3. The device of claim 1, further comprising a chamber flexibly coupled to the distal end of the elongated member and having a predetermined orientation with respect to the elongated member wherein the location indicating element is contained within the chamber and wherein an encounter with an obstacle causes a change in the orientation of the chamber.
4. The device of claim 3, further comprising a flexible joint member having first and second ends, the first end being coupled to the distal end of the elongated member and the second end being coupled to the terminal chamber.

5. The device of claim 4 wherein the flexible joint member has sufficient stiffness to maintain the orientation of the chamber under the influence of both gravity and the forces from flowing blood within a patient's vasculature.

6. The device of claim 4 wherein the flexible joint member comprises a solid rubber member.

7. The device of claim 4 wherein the flexible joint member comprises a hollow rubber member.

8. The device of claim 4 wherein the flexible joint member comprises a flexible metal member.

9. The device of claim 4 wherein the flexible joint member comprises an elastic polymer member.

10. The device of claim 1 wherein the location indicating element is a permanent magnet.

11. The device of claim 1 wherein the location indicating element comprises a plurality of permanent magnets oriented with respect to each other such that the respective magnetic fields are additively combined.

12. The device of claim 1 wherein the location indicating element is an electromagnet.

13. The device of claim 1 wherein the location indicating element is a radio frequency coil operating at a predetermined radio frequency.

14. The device of claim 1 wherein the location indicating element is an antenna.

15. The device of claim 1 wherein the location indicating element is a strain relief sensor.

16. The device of claim 1 wherein the elongated member is a selected one of a group comprising a tube, catheter, guidewire, or other insertable medical device.

17. The device of claim 1, further comprising a detector system capable of detecting the location indicating element from a location external to the body, the detector system including a display to indicate an orientation of the location indicating element.

18. A method for detecting an encounter with an obstacle during insertion of a medical device designed for insertion into a body, the method comprising:
selecting an elongated member having a proximal end and a distal end for insertion into the body; and
flexibly coupling a location indicating element to the distal end of the elongated member, the location indicating element being capable of being tracked from a location external to the body wherein an encounter with an obstacle causes a change in the orientation of the location indicating element.

19. The method of claim 18 wherein the location indicating element is flexibly coupled to the elongated member using an elastic polymer member.

20. The method of claim 18, further comprising placing the location indicating element in a chamber flexibly coupled to the distal end of the elongated

member to provide the location indicating element within the chamber a predetermined orientation with respect to the elongated member wherein an encounter with an obstacle causes a change in the orientation of the chamber.

21. The method of claim 20 wherein flexibly coupling to the distal end of the elongated member comprises attaching a flexible joint member having first and second ends between the chamber and the elongated member, the first end of the flexible joint member being coupled to the distal end of the elongated member and the second end being coupled to the terminal chamber.

22. The method of claim 21 wherein the flexible joint member has sufficient stiffness to maintain the orientation under the influence of both gravity and the forces from flowing blood within a patient's vasculature.

23. The method of claim 18 wherein the elongated member is a selected one of a group comprising a tube, catheter, guidewire or other medical device.

24. The method of claim 18, further comprising inserting the distal end of the elongated member into the body and monitoring the orientation of the location indicating element wherein an encounter with an obstacle causes a change in the orientation.

25. The method of claim 24 wherein the elongated member is a selected one of a group comprising a tube, catheter, guidewire or other medical device.

26. The method of claim 24, further comprising detecting the location indicating element from a location external to the body and displaying an orientation of the location indicating element.